REMARKS

This Response addresses the issues raised by the Examiner in the Office Action mailed June 13, 2005. Initially, Applicants would like to thank the Examiner for the careful consideration given this case. In view of the previous amendments and the following remarks, Applicants feel that all outstanding issues have been addressed and prompt allowance of all remaining claims is respectfully requested.

September 27, 2005 Interview

Applicants would like to thank both Examiner Rodriquez and Primary Examiner Hudspeth for kindly allowing Applicants' representative to interview this case at the USPTO on September 27, 2005. At the interview, Applicants' representative explained the characteristics and use of the claimed "dummy signal" distinguished from the "burst signal" in the burst area of a perpendicular magnetic recording system. Specifically, Applicants discussed with the Examiners the reason that longitudinal recording prior art has no teaching or suggestion of the claimed concepts of present invention, and so should not be used as part of a 35 U.S.C. §103 rejection. Preliminary agreement on a slight claim amendment (*see* discussion below) appeared to be reached between the Examiners and Applicants' representative.

Applicants' representative began the interview by discussing a figure entitled "1. Reproduced Waveform" which was previously discussed with the Examiners at an interview held on February 17, 2004. This figure shows the structure and reproduced waveform for the general case of both longitudinal (upper half of figure) and perpendicular (lower half of figure) recording. The important feature to note is the DC magnetization in both cases. As is clear from this drawing, longitudinal recording is characterized by no DC response while perpendicular recording includes an (unwanted) DC response (or "offset").

Figures 19 and 20-21 of the present application were then discussed with the Examiners to further point out this important distinction. Figures 19(a) and 19(b) show the recorded magnetization state and the produced waveform (respectively) for *longitudinal* recording. As discussed in the specification beginning at p. 7, line 17, "[t]he longitudinal magnetic recording system has no response to the DC magnetization, and a single-peaked output is produced only at transition." The reproduced waveform of this signal (Fig. 20(a)) shows that longitudinal recording has no DC offset (waveform centered around 0). Therefore,

the integrated signal of the absolute value of this waveform (shown in Fig. 20(b)) "indicates that the amplitude of each burst [Fig. 20(a)] and that of a corresponding signal [Fig. 20(b)] coincide well in magnitude with each other. *See* Specification at p. 7, line 13 through p. 8, line 2. In other words, because there is no DC magnetization problem, the final integrated signal accurately reflects the intended waveform and, hence, gives accurate position information.

Fig. 19(c), on the other hand, shows the recorded magnetization state for *perpendicular* recording assuming a waveform for the reproduced signal of Figure 19(d). Fig. 21(a) shows the reproduced waveform for perpendicular recording "which undesirably has a DC offset" (not centered around 0). *See* Specification at p. 8, lines 3-20. Therefore, when this signal is integrated (Fig. 21(b)) in order to obtain the position information for the recording head, the resulting waveform "fails to correctly represent the amplitude level of the burst signal" and, hence, does not accurately provide the intended position information. Specification at p. 9. Moreover, the resulting signal, produced after filtering, shown in Fig. 22 is severely skewed and does not accurately reflect the magnitude of the burst signal. Specification at p. 8, lines 15-20. The present invention is directed to this DC magnetization error that *only* exists in the realm of *perpendicular*, and not *longitudinal*, magnetic recording. Applicants' representative next described the claimed novel feature of the invention with reference to Fig. 7. Fig. 7 shows a waveform of the servo area for perpendicular recording using the dummy area of Fig. 1. Note how the dummy area cancels out or removes the DC offset so that the signal is similar to that reproduced for longitudinal recording. When integrated (lower portion of Fig. 7), the resulting position signal now *accurately* reflects the intended waveform of the burst signal, and the position of the head traveling over the perpendicular magnetic medium can be accurately determined. Specification at p. 16, lines 8-23.

Figs. 1 and 2 were next discussed with the Examiners to describe the invention. Fig. 2 shows a conventional burst area with a "hounds tooth" burst signal pattern and a "DC-erased area" between the burst signals. *See* Fig. 2. This is the burst area pattern used in longitudinal recording and used in perpendicular recording *before* the present invention. Fig. 1 shows the use of a dummy signal according to the present invention. In Fig. 1, the dummy signal is shown with twice the frequency (one-half the bit length) of the burst signal in order

to cancel the unwanted DC magnetization effects (DC offset). This effect was described in the application:

> In this way, the demagnetization field in the servo area is reduced, and the anti-signal decay performance is improved while at the same time suppressing the shift of the end of the burst signal area for an improved servo signal quality. In this invention, the DC erased area of the servo area where a signal of a shorter wavelength than the burst signal is called a dummy signal.

Specification at p. 10, lines 7-14. This is a problem unique to perpendicular recording, and is not encountered in longitudinal recording – and can therefore neither be suggested as a problem nor taught as a solution thereof.

Finally, a new figure was shown to the Examiners which shows the voltage waveform and frequency spectrum for both longitudinal (traditional) recording and perpendicular recording according to the present invention. Specifically, this figure shows the frequency response for the case when the dummy signal has a frequency twice as high as the burst frequency. As described in the specification, having the dummy signal at least twice the frequency (half the bit width) of the burst signal frequency is preferred. *See* Specification at 14, 15, 16 and 18. Moreover, making the dummy signal an integer multiple of the burst frequency also allows for a more easy filtering process. *See* Specification at p. 11. This "doubled" frequency and integer multiple concept are described throughout the specification and reflected in new dependent Claims 32-37.

At the end of the interview, the Examiners presented Applicants' representative with an interview summary. Both the amended claims and the new dependent claims were specifically discussed, and it is Applicants' representatives' impression that all these claims are now in condition for final allowance.

§103 Rejection

In the Office Action dated June 13, 2005, Claims 13, 14, 15, 17, 22-25 and 27-30 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,602,620 Kikitsu et al. ("Kikitsu") in view of U.S. Patent No. 6,025,970 Cheung ("Cheung"). At the

interview, Applicants' representative and the Examiners discussed each of the cited references and each was distinguished from the present invention.

The main reference, Kikitsu, merely teaches a perpendicular recording device, but, by the Examiner's own Office Action, "fail[s] to teach wherein the first area is a burst area and the second area is the dummy area." Office Action at 3. In other words, even the Examiner acknowledges that Kikitsu does not teach the claimed invention. Moreover, Kikitsu definitely does not teach the currently claimed (through the present amendment) use of the claimed dummy area which is adapted to cancel a DC offset. In fact, Kikitsu merely teaches a standard perpendicular recording system in which magnetic recording cells are suspended in a non-magnetic matrix. This has no relation to the present invention's removal of the unwanted DC magnetization offset.

Cheung adds nothing pertinent to the teachings of Kikitsu. Cheung is directed to *longitudinal* recording and is in no way analogous to the problem at hand or the present solution to the DC magnetization problem. The two areas (A1 and A2) of the Cheung burst area are merely first and second frequency burst signals – both used for position sensing. There is no teaching or suggestion in Cheung directed to the use of a dummy signal which is adapted to cancel a DC offset (as in the amended claims). Of course, because Cheung is directed to longitudinal recording, there is no DC offset to correct. Therefore, Cheung adds nothing relevant to Kikitsu and is not the proper basis of a §103 rejection.

Moreover, to the extent the Examiner has asserted that Cheung somehow teaches a burst area with signals of two different frequencies, this is inapplicable to the present invention. First, as stated above, Cheung is a longitudinal recording system and does not have an unwanted DC offset. Also, Cheung certainly does not teach that the dummy area is adapted to cancel this DC offset (which does not exist in Cheung). Moreover, Cheung does not teach the new dependent limitations of the dummy signal being at least twice (and/or an integer multiple of) the frequency of the burst signal. For at least all these reasons, Kikitsu alone or in combination with Cheung does not render the presently amended claims obvious.

Conclusion

The above remarks address each and every concern raised by the Examiner in the Office Action. Applicants believe that all remaining claims of the present invention are now

in condition for final allowance. If the Examiner feels that any issues remain outstanding, the Examiner is encouraged to contact Applicant's attorney at the contact information below.

Respectfully submitted,

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